# Methodology Behind the Digital Personas Qualitative Surveys at Scale

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**Introduction**

Understanding women's digital lives requires more than measuring whether they own or can access a phone. It requires understanding how digital tools fit into daily routines, livelihoods, relationships, risks, aspirations, and constraints. For women and girls in low- and middle-income contexts, digital connectivity is often shaped not by a single barrier, but by a set of overlapping conditions: affordability, social norms, household power dynamics, safety concerns, confidence, skills, and the practical interruptions that determine whether a phone can actually be used when it is needed.

The Digital Personas study was designed to capture this complexity. Using Decodis' Qualitative Surveys at Scale methodology, the study combined the breadth of a large survey with the depth of open-ended qualitative research. More than 4,500 women across Kenya, Nigeria, and Senegal participated through voice-based survey methods that allowed them to respond in their own languages, in their own words, and at their own convenience. Their responses generated a large body of qualitative and acoustic data that could be analyzed not only for what women said, but also for how they expressed confidence, hesitation, enthusiasm, or concern.

This methodology paper explains how the study was designed, implemented, and analyzed. It describes the sampling approach, recruitment process, voice-based survey design, use of audio skits, AI-assisted thematic coding, and sociolinguistic analysis of emotional engagement. It also summarizes the key findings that emerged from the approach: that smartphone access is often higher than expected, but that women's digital engagement is constrained by discontinuous use, self-imposed restriction, social censure, shame, and uneven confidence. Together, these findings show the value of listening at scale: generating data that is broad enough to identify patterns, yet rich enough to preserve the lived experience behind them.

**Specific objectives of using qualitative surveys at scale for the Digital Personas study**

The Digital Personas study set out to use Qualitative Surveys at Scale to understand the barriers and benefits to digital connectivity for women and girls in developing countries, and how these intersect with lives and livelihoods outcomes. The project addressed a fundamental gap in the research landscape: the absence of qualitative data at scale that could generate meaningful insights for vulnerable women and girls.

Specifically, the study sought to:

- Conduct large-scale qualitative surveys across Kenya, Nigeria, and Senegal, drawing samples using the Pathways vulnerability typing tool to ensure targeted and representative data collection.
- Capture nuanced, ground-truth insights on women's barriers to digital connectivity – including affordability, gender norms, safety, and device ownership – through Interactive Voice Response (IVR) and Natural Language Processing (NLP)
- Generate diagnostic insights that go beyond reporting, producing findings deep and broad enough to support teams in designing targeted interventions, identifying partnerships, and meeting women where they already are in their digital lives

## Methodology

### Who We Were Trying to Reach

The study engaged with over 4,500 women across seven populations in Kenya, Nigeria, and Senegal, covering both urban and rural settings. The study focused specifically on women who already had some access to a phone, with the goal of understanding the texture of their digital lives rather than measuring basic access. Within those regions, fieldwork covered:

- Nairobi, Kwale, and Nakuru in Kenya;
- Kano, Kaduna, and Lagos in Nigeria; and
- Dakar, Diourbel, Kolda, Saint Louis, and Thiès in Senegal.

Sampling was stratified across urban and rural settings and by vulnerability level using the Pathways typing tool found at https://withpathways.org/en/welcome.

### How We Recruited

Field officers were deployed across all regions to recruit participants in person. They explained the purpose of the study, confirmed eligibility, and obtained consent. Respondents selected a preferred date and time for survey participation during recruitment to ensure availability and reduce non-response.  At the time of recruitment, photos of women's phones

were taken to later compare against the type of phone they said they had access to during the survey.

Incentives were paid after each module was completed. Response rates ranged from 55% in rural Kenya to 94% in urban Kenya, with all other regions falling between 75% and 89%.

**How We Ran the Survey**

A core design requirement was that women did not need to be literate to participate. All questions were pre-recorded by local voice actors – not AI-generated – speaking in a friendly, conversational tone in the respondent's own language: Hausa, Yoruba, Kikuyu, Swahili, Wolof and Pulaar. Respondents only needed to know how to answer a phone, speak into it, and press keypads.

In Kenya and Nigeria, surveys were administered via asynchronous IVR, where respondents received a phone call with a real voice actor asking the survey questions in one of the local languages mentioned above and in a friendly tone. Respondents could pause, resume, or complete the survey at a time of their choosing. Calls were scheduled based on preferred hours indicated during recruitment. In Senegal, where the cost of phone calls was prohibitive, respondents instead received a survey link via WhatsApp or SMS, enabling them to record voice responses at their convenience with the same flexibility. Prior to each module, field officers sent reminder calls to confirm availability, reinforce consent, and prepare respondents. Where needed, in-person follow-ups were conducted to resolve access, technical, or comprehension challenges.

Contrary to expectations, not having a live interviewer means that respondents speak for longer and provide richer information. Decodis has found that responses are three times longer than those typically generated in a live in-person interview.[1] Social desirability bias is a well-studied survey challenge and not having an interview with a live person helps alleviate that stress, as does not being interrupted by enumerators.

The scale of data collected was substantial across the study countries, generating roughly 400 hours of voice recordings for each country. These recordings have been released onto the research data repository of Zenodo.

## The Survey Instrument

The survey was organised into three modules. Module 1 covered demographics and device journey. Module 2 covered usage and learning. Module 3 explored sensitive topics through audio skits on ownership, safety, and wellbeing. Each module combined two response types:

[1] Collins et al, Sentiment of Bangladeshi Residents Toward Covid-19 Lockdowns: Qualitative Analyses of Open-Ended Responses in a Large Panel Survey. BRAC University, 2023. Available here.

keypad responses to capture quantitative prevalence, and open-ended voice responses to capture contextual nuance.

**Module 1 (M1) — Foundational profile: devices, ownership, access**

M1 is the first contact call. It opens with consent, then runs through warm-up practice questions before covering:

- **Demographics:** age, marital status, household composition, work / income, children, schooling, electricity access.
- **Phone history:** first phone the respondent ever used, age at first use, ownership of that phone, then a chronological tour of every phone they have owned since.
- **Current primary phone:** type (smartphone / feature / basic), new vs. second-hand, ownership status, who else uses it, what they like about it, daily usage patterns over the last 3 days, charger and battery arrangements.
- **Second phone (if any):** the same battery of questions applied to a secondary device.
- **Future phone aspirations:** and buying phones on credit.
- **Other devices:** tablets and laptops / computers — ownership, who else uses them, recent activities.
- **SIM cards:** number owned, whether they own SIMs without a phone to put them in, SIM-sharing across phones.
- **Communication & language:** how they reach others (calls, voice notes, text), preferred channel, language used, language barriers to using apps.
- **Charging:** where and how phones are charged, who takes the phone for charging, cost, time spent away from the phone.
- **Storage management:** running out of space, what gets deleted.
- **PINs / passwords / privacy:** including who else knows the PIN and why.

**Module 2 (M2) — Daily phone use, internet, and livelihoods**

M2 (week 2) shifts from device inventory to how the phone is woven into daily life, work, and economic activity. Responses are predominantly open-ended RECORD actions.

**Common themes across all three countries**

- **Internet & data:** use of internet, mobile data vs. wifi, who pays, spend per bundle, what happens when data runs out, problems, use of cyber cafés / business centres.
- **WhatsApp & other apps:** WhatsApp account ownership, calls / messages / voice notes, other social media apps used, who helped install them, lite versions of apps that use less data.
- **Information seeking & trust:** where they look for news / learning, what they have learned on the phone, how they decide whether to trust information, a story of information that helped a real decision.
- **Health information seeking:** whether they use the phone for health info, what kind, health apps and websites used, phone vs. clinic.
- **Entertainment:** music, videos, religious content (Quran, sermons, bible readings).
- **Photo, sharing, utility uses:** taking photos, with whom photos are shared, Bluetooth / Xender file sharing, radio, torchlight.
- **Livelihoods:** how the phone helps find work and earn money, customer / supplier communication, business uses.
- **Mobile Money:** use cases — saving, payments, transfers, loans.
- **Help-seeking:** who they ask for help with the phone, comfort vs. shame when asking, places in the community (cyber cafés, business centres) where they get help.
- **Surveillance and control of phone use:** whether anyone in the household checks their phone, how that feels, behaviour change when worried about being seen.

**Module 3 (M3) — Vignette-based: norms, safety, privacy, health, wellbeing**

M3 (week 3, final call) is structurally distinct: it uses short scripted "skits" or stories about fictional women, followed by reflective questions inviting respondents to project their own experiences onto the character. All responses are open-ended RECORD.

*All three M3 instruments share a common four-theme spine — device ownership and control, safety and security, digital for health, and digital well-being. Senegal adds a fifth theme (digital help-seeking and community norms). The discussion below groups the three countries together under each theme.*

**Theme 1 — Device ownership and control**

All three countries open M3 with a skit about a woman whose phone ends up in the hands of a male family member, despite the phone having been bought for her or by her.

- **Kenya — Wambui:** her daughter bought her a smartphone but her husband keeps it most of the time; the chama is about to start using M-PESA and Wambui has no way to deposit her contribution.
- **Nigeria — Iya Bisi:** her daughter Bisi (working as a house help in Lagos) saves up to buy her a phone so she can run her soap business on WhatsApp, but her father takes the phone for his own business and the mother does not see it as a problem.
- **Senegal — Fatou:** a story exploring phone control, household expectations around women's phone use, sharing within the family, and community attitudes toward women who spend a lot of time on their phones.

Probing questions cover: who should own the phone and have it in their possession; why women let male family members hold the phone; what friends and family would advise; lending and borrowing practices in the respondent's own life; in Senegal specifically, expectations about when women should or shouldn't use phones, sharing with family, balancing phone use with household responsibilities, and community attitudes.

**Theme 2 — Safety and security**

All three countries use a skit about online harassment by an ex-partner or hostile party, then explore how the respondent would protect herself.

- **Kenya — Grace:** an ex-boyfriend is harassing her with messages and threatening to post their private photos and messages on Facebook and WhatsApp where her parents and friends can see.
- **Nigeria — Sade:** a college student whose ex-boyfriend (involved in a school cult) bombards her with threatening calls from different numbers, insults her on Facebook, and harasses her friends online. She debates whether to delete Facebook altogether.
- **Senegal — Aisha:** a more general digital-privacy story (Aisha's "digital journey") that covers online safety, harassment, and learning to use apps safely.

Probing questions cover: what the respondent would do in the character's place; whether anything similar has happened to them or someone they know; what advice a friend should give; protecting private information online; the chilling effect on what they do online; digital privacy management more broadly (PIN sharing, blocking and reporting, who is responsible for keeping women safe online — these last three are particularly developed in Senegal).

**Theme 3 — Using digital for health**

All three countries use a skit in which a woman has a health concern, a friend recommends the internet, and an older relative or the woman herself is sceptical of online health information.

- **Kenya — Jane:** a new mother weaning her 6-month-old wants to search online for feeding information; her mother Ruth insists she go to the clinic instead. Jane's friend Lucy has used the internet successfully throughout her own pregnancy.
- **Nigeria — Bola / Safiya:** Safiya, displaced by Boko Haram, has worsening symptoms and no money for the hospital; her friend Amina urges her to search symptoms online and consult a pharmacist. Safiya distrusts the internet because she has never used it. (The M3 instrument file uses a parallel character named Bola.)
- **Senegal — Maimouna:** uses her phone at night to look up information when her baby develops a fever and rash.

Probing questions cover: where the respondent finds health information in her own life and why she trusts those sources; how comfortable she is using internet health info; what kinds of health information she would or wouldn't look up online; how she would verify online health information; whether to follow online treatment advice; who she discusses it with afterwards; what she would want from health workers via phone (especially developed in Senegal); language barriers in health content.

**Theme 4 — Digital well-being**

All three countries use a skit about distressing content on WhatsApp affecting a woman's mental well-being and her use of the platform.

- **Kenya — Alice:** she had used WhatsApp groups to market her clothing business countrywide but left after group members repeatedly forwarded inappropriate photos and violent videos. She is now considering shrinking her WhatsApp network to close family.
- **Nigeria — Ronke / Tolani:** Ronke left the "young and hungry" WhatsApp group after members began posting explicit videos about the experiences of women who escaped Boko Haram or kidnappers; she had previously viewed all her WhatsApp contacts as potential clients for her work. (The instrument file uses the parallel character Tolani.)
- **Senegal — Alice / Aida:** Senegal pairs a wellness skit with "Digital Expectations" (Aida) — a vignette about navigating different community and gender expectations around women's phone use.

Probing questions cover: what the respondent would do in the character's place; whether seeing bad content affects what they do online; how the threat of leaking information would affect what they do online; what the character can do to protect herself from seeing bad content; in Senegal, broader community norms about women's phone use, post-marriage expectations, urban vs. rural differences, and pressure to share content they were uncomfortable sharing.

**Theme 5 — Digital help-seeking and community norms (Senegal only)**

Senegal M3 adds a fifth theme not present in Kenya or Nigeria, anchored by the "Rama / Learning Together" skit. It explores how women learn to use new features on their phones, who they ask for help, embarrassment about not knowing how to use a phone, helping others learn, language barriers on the phone, and how phone type and education influence community status.

**Qualitative Depth: Audio Skits**

A distinctive methodological feature of this study was the use of audio skits in Module 3. Audio skits are short, pre-recorded stories featuring fictional characters navigating everyday situations. Rather than asking a respondent directly about her own experiences, the study played her a story about someone else in a similar situation and asked what she thought. Because respondents were reacting to a character rather than speaking about themselves, they were more likely to share honest perspectives – including unstated emotions and views that direct questioning can miss.

Each study incorporated between four and six skits covering topics including phone ownership, safety, and control. Respondents were only ever exposed to audio versions of the skits via phone call; video versions exist solely for illustration and translation purposes. The effect on response quality was measurable: responses to skit-based questions were on average three times longer than responses to other open-ended question types.

Link to access skits

**How We Processed the Audio**

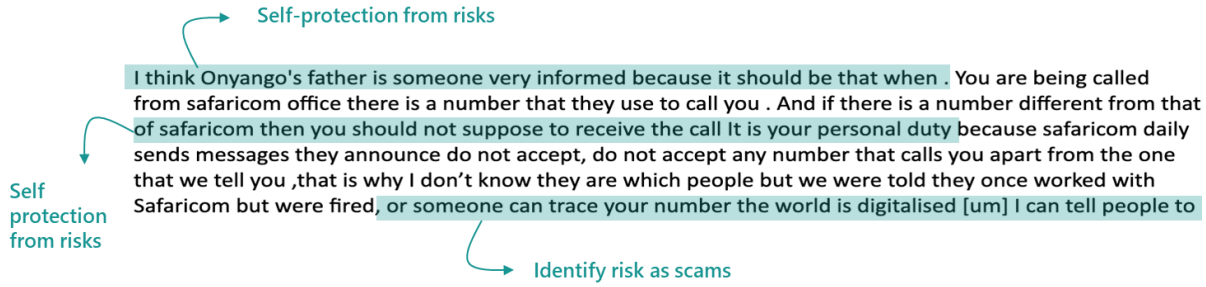
The survey generated over 350,000 audio clips across the five regions where audio data was processed. The proportion of unintelligible clips was low – 1–2% in Kenya and 5–9% in Nigeria. Except for Swahili, for which Decodis used its own automated translation model, all audio responses were manually translated and transcribed into English by local translators, who flagged any clip marked as poor quality, unclear, or noise-affected.

How We Analyzed Meaning

Given the scale of qualitative data collected, the study used an AI-assisted coding approach to categorise open-ended voice responses.  Our process started with randomly selecting 30 responses per question and manually coding by analysts using an inductive approach until reaching “saturation” – a point when no new thematic categories emerged.  Below we show

an example of coding how a Kenyan woman described how someone in a skit should have protected herself from scam calls.

**Figure 1: Example of how open-ended, transcribed audio responses were coded**




We then go through a three-step process to analyze the full sample of responses. First, we wrote a structured prompt specifying the analytical context, the task, and precise output formatting instructing the AI to apply the manually derived categorisation scheme to the full sample. Second, this prompt was run across the entire sample, allowing tens of thousands of open-ended responses to be tagged consistently and at scale. Third, codes were iteratively refined through extensive testing to ensure robust fit with the data. The text analytics platform underpinning this process integrates multiple large language models alongside Retrieval-Augmented Generation (RAG) methodology to maximise accuracy on nuanced notions and uses probability-based techniques to further minimise bias – with human-in-the-loop oversight at each stage to ensure robustness and guard against hallucinations.

The critical advantage in this technique over manual coding is its ability to qualitatively analyze thousands of responses at once. **This is important because a large sample can tell us whether themes are prevalent across a sample or segment, and not an isolated result.**

**Figure 2: Using prompt-writing to tag themes in each question**

**Step 1: We write the prompt to assess each transcript against the description of the theme we want tagged.**

**Step 2: The model tags responses. In this case, tens of thousands of open-ended responses.**

**Step 3: We iterate with the model two or three times, improving the prompt and outputs.**

**Context**

The following texts are responses to questions about the risks and benefits of WhatsApp for business, online banking, POS transactions

**Task**

Based on the context, tag the response to the appropriate category based on what the respondent says about the risks of using online banking, POS transactions or platforms like WhatsApp for business.

**Categorization Scheme**

UnauthorizedPlatformAccess* – Hacking of WhatsApp or bank accounts due to lack of 2FA, malware, or SIM swap.

CyberFraud* – Fears of hackers, phishing, impersonation calls, and information theft through digital channels. Identity&ProfileTheft* – Impersonation on platforms like WhatsApp, with fake profiles used to scam others. ConnectivityFailures* – Frequent loss of signal, network downtime, or poor internet disrupting transactions, causes anxiety.

**Output Instructions**

Label the response with the relevant category name as listed in the categorization scheme

| Resp ID | Transcription of response | Tags |
|---|---|---|
| Resp_001 | **Someone has to be very careful while making online transactions or filling of forms.** | "Personal Responsibility" |

## How Audio Was Used for Analysis

To capture not just *what* respondents said but *how* they said it, we extract three acoustic signals from each recorded response: pitch modulation (the rise and fall of the voice), intensity (loudness), and word count (length of response). These signals are combined into a single composite measure.

In addition to text-based coding, the study applied sociolinguistic analysis to the audio recordings themselves. Using Praat, a speech signal extraction tool, acoustic measures – principally pitch and intensity – were taken from respondents' voices across their recorded responses. Each measure was normalized using Lobanov Z-score normalization across all responses, calibrating each response to the respondent's own voice rather than comparing it directly against other speakers. This normalization procedure controls for known confounds including gender (e.g. women generally speak at higher pitch than men), cross-linguistic variation in intonation and volume, and idiosyncratic vocal behavior.

The resulting measures were then interpreted through a framework of two emotional fundamentals drawn from the academic literature: activation (the intensity or strength of an emotion – the difference between, say, feeling content and feeling elated) and valence (the emotional direction – the difference between feeling happy and feeling angry). Compiled indicators across pitch, intensity, and word count were used to operationalise emotional response at the level of individual questions, producing several of the study's most significant findings – including the distinction between women who expressed shame about asking for help and those who pushed through it and the gap between women who stated they would use digital protective strategies and those who sounded genuinely confident doing so.

A key design choice is personal baselining. Rather than comparing respondents against each other – which would conflate natural variation in language, dialect, and speaking style – each person's score is calculated relative to her own voice across other responses. This normalises for individual differences and isolates genuine shifts in emotional engagement.

The composite score reflects the degree to which a response deviates above or below a participant's own baseline. We characterize upward deviation (higher pitch

variation, greater loudness, longer responses) as relative enthusiasm, and downward deviation as relative indifference, following the framework established by Freeman (2019) on prosodic features of conversational stance.

This approach allows us to say, with acoustic evidence, where respondents were genuinely engaged versus where they spoke in a more neutral or detached way – adding a layer of behavioural data that self-reported responses alone cannot provide.

**Summary of Key Findings**

### Cross-Cutting Finding: Access to Smartphones Is Not the Biggest Barrier

The most consequential cross-cutting finding is that phone access is a substantially less significant barrier than commonly assumed. In every region except rural Northern Nigeria, at least half of women already have access to a smartphone (Lagos and Urban Senegal: 75%; Urban Kenya and Rural Kenya: 66%; Urban N. Nigeria and Rural Senegal: 50%; Rural N. Nigeria: 41%).

Moreover, between one-third and one-half of women across all three countries described their phones as more basic than photos of those phones confirmed – almost always underreporting the sophistication of the device they actually used. This systematic pattern suggests that surveys relying on self-reported phone type significantly underestimate women's existing access to digital tools, and points to a deeper conclusion: the barriers that most meaningfully limit women's digital engagement are not found in device access, but in the discontinuities, social pressures, and confidence gaps that shape how – and how much – they are able to use the devices they already have.

### Drivers: Why Women Want to Use Digital

Women across all regions expressed strong motivation to engage with digital technology, driven by three consistent forces:

#### 1. Earning Money

For women running businesses, phones are the primary channel through which customers are reached, transactions are made, and new ideas are learned. Across urban and rural Kenya, approximately half of women in business say their phone helps them inform customers about goods and services. In Lagos, 58% of businesswomen cite promoting goods and services as a key benefit; in Senegal, ease of transactions is the top benefit (Urban Senegal: 51%, Rural Senegal: 47%). Women in casual or wage work use phones primarily to be contacted for jobs and to coordinate transactions. The boundary between "personal phone" and "work tool" effectively disappears for women who sell online, making data interruptions and forced phone-sharing especially costly.

### 2. Expanding Knowledge

Between 67% and 88% of women report using their phones to access information about news, decisions, family matters, and learning. WhatsApp and social media are among the most used platforms (Kenya: 75–78% WhatsApp; Lagos: 85%; Urban Senegal: 94%). Where women go online to learn, they describe videos and other women's comments as their most trusted sources, often watching content repeatedly until they understand it.

### 3. Access to Health Information

Health-seeking is a particularly strong driver in Kenya, where 86% of women say they would look for health information online, compared with roughly 66% in Nigeria and urban Senegal, and 43% in rural Senegal. The type of information sought differs by country: in Kenya, women seek preventative knowledge (nutrition, disease understanding); in Nigeria and Senegal, women focus on diagnosing current symptoms and identifying medication. Across all regions, women consistently describe feeling empowered by what they find online – valuing the privacy, convenience, and ability to arrive at appointments better prepared.

## Barriers: What Slows Women Down

### Barrier 1: Discontinuous Use

Three forms of discontinuity interrupt women's digital access:

- **Data bundle management:** Women turn data on and off to stretch limited budgets, balancing data costs against food, schooling, and other expenses. Patterns differ sharply by region: in Urban Kenya, women spend a median of $1.12/week and purchase data up to 7 times a week, constantly interrupting online activities; in Senegal, women buy a larger bundle once a month ($0.83) and ration it, disrupting learning and ongoing uses; in Northern Nigeria, women spend as little as $0.19–$0.23/week but top up 1–2 times weekly, creating persistent discontinuity.
- **Charging outside the home:** Where electricity is unstable, women rely on fee-based charging businesses and face extended periods without their devices. In rural Northern Nigeria, 46% of women must charge outside the home, leaving them without their phone for 19 hours per week – the equivalent of more than two working days. Rural Senegal (42%, 16h/week) and Urban Northern Nigeria (30%, 18h/week) are similarly affected.
- **Giving up the phone:** Coercion into surrendering the phone to others represents a third form of discontinuity, most pronounced in Nigeria. When presented with a scenario about a husband taking his wife's phone after his broke, 60% of Lagos women and 54% of Rural Northern Nigeria women described this as acceptable – often citing the husband's work needs while downplaying their own income-earning use of the device. In Kenya, views were more balanced, with roughly 39% considering it unacceptable.

### Barrier 2: Self-Imposed Restriction

Women also limit their own digital engagement in response to two distinct pressures:

- **Exposure to disturbing content:** Across Kenya and Nigeria, 49–70% of women say they would withdraw from social media or messaging apps after encountering violent or offensive content. The rate is highest in rural Northern Nigeria (60–70%), with over 50% in Kenya. Women's primary protective strategy is platform exit rather than content filtering.
- **Social censure and community norms:** In Senegal, community disapproval of women's phone use is a more pressing concern than online harassment. Over 90% of women expressed that they should only display moral behaviour online to avoid community backlash. Between 10–15% described leaving WhatsApp groups, deleting accounts, or stopping digital engagement entirely as their primary privacy protection strategy.

### Barrier 3: Confidence and Skills

Between 70% and 80% of women in Kenya and Nigeria report feeling ashamed when asking for help with their phones. Sociolinguistic analysis reveals that the experience of shame is not uniform across regions:

- Women in Urban Kenya are most likely to withdraw from help-seeking entirely after experiencing shame – the strongest "discouraged" response pattern across all regions studied.
- Women in Lagos express comparable levels of shame but show greater resilience in pushing through it, demonstrating the most "determined" response pattern and the least likelihood of withdrawal.
- Women in Senegal show a different dynamic, tending to seek help within their households (which are considerably larger on average), resulting in a less pronounced shame response overall.

A parallel confidence gap exists around online safety. Acoustic analysis found that women in Rural Kenya and Rural Northern Nigeria who described using digital protective strategies – such as blocking contacts or using passwords – sounded statistically significantly more doubtful than confident when doing so, suggesting that stated behaviours may not reflect genuine capacity to act.

Several limitations are important to note. The study intentionally focused on women who already had some access to a phone and therefore should not be read as a measure of basic phone ownership or population-wide digital access. The acoustic analysis is best interpreted as a measure of relative emotional engagement within each respondent's own response

pattern, rather than as a clinical or universal classification of emotion. Finally, because implementation varied across countries, including the use of IVR in Kenya and Nigeria and WhatsApp/SMS links in Senegal, cross-country comparisons should be interpreted with attention to mode and context.

**Conclusion**

The Digital Personas study demonstrates that qualitative research at scale can reveal dimensions of women's digital lives that conventional survey methods often miss. By combining large-sample reach with open-ended voice responses, audio skits, AI-assisted thematic coding, and acoustic analysis, the study was able to move beyond simple measures of access to identify the social, emotional, and practical conditions that shape digital engagement. The findings show that many women already have more access to digital tools than self-reported data suggests, but that use is constrained by discontinuity, social pressure, shame, safety concerns, and uneven confidence. These are not barriers that can be solved by device distribution alone. They require interventions that are more specific, more contextual, and more responsive to how women actually use, negotiate, and feel about digital technology in their daily lives. Methodologically, the study shows that listening at scale can produce both breadth and depth: it can quantify patterns across thousands of respondents while preserving the nuance, emotion, and lived experience that make those patterns meaningful.

## Annex: Sample Distribution by Country, Region, and Segment

The study engaged a total of over 4,500 women across Kenya, Nigeria, and Senegal. Sampling was stratified by vulnerability segment using the Pathways segmentation framework, with geographic distribution emerging from where segments were naturally found rather than predetermined regional quotas. The tables below show the final distribution of respondents across segments and regions for each country.

### Table 1: Kenya – 1,264 respondents across Nairobi, Nakuru, and Kwale

*Kenya sample distribution by segment and region*

| Segment | Nairobi | Nakuru | Kwale | Total |
|---|---|---|---|---|
| UF2-K | ✓ | ✓ | ✓ | — |
| UF4-K | ✓ | ✓ | ✓ | — |
| UM1-K | ✓ | — | ✓ | — |
| UM4-K | ✓ | ✓ | ✓ | — |
| RF2-K | ✓ | ✓ | ✓ | — |
| RF4-K | — | ✓ | — | — |
| RM2-K | — | ✓ | ✓ | — |
| RM3-K | — | ✓ | ✓ | — |
| RM4-K | — | — | ✓ | — |
| **Total** | **169** | **568** | **527** | **1,264** |

*Segment codes: U = urban, R = rural; F = female-headed household, M = male-headed household; number denotes vulnerability level within the Pathways framework.*

### Table 2: Nigeria – 1,416 respondents across Kano, Kaduna, and Lagos

*Nigeria sample distribution by segment and region*

| Segment | Kano | Kaduna | Lagos | Total |
|---|---|---|---|---|
| U1_NN | ✓ | — | — | — |
| U2_NN | ✓ | ✓ | — | — |
| U3_NN | ✓ | ✓ | — | — |
| U4_NN | ✓ | ✓ | — | — |
| R2_NN | ✓ | ✓ | — | — |
| R3.1_NN | ✓ | ✓ | — | — |
| R3.2_NN | ✓ | ✓ | — | — |
| UF1_L | — | — | ✓ | — |
| UF3.1_L | — | — | ✓ | — |
| UM1.2_L | — | — | ✓ | — |
| UM3_L | — | — | ✓ | — |
| UM4_L | — | — | ✓ | — |
| **Total** | **474** | **488** | **454** | **1,416** |

*Segment codes: U = urban, R = rural; NN = Northern Nigeria, L = Lagos; number denotes vulnerability level. Lagos segments are distinct from Northern Nigeria segments, reflecting the separate Pathways segmentation framework applied in each context. Region-level totals are shown; segment-level counts within each city were not disaggregated in the source data.*

### Table 3: Senegal – 1,833 respondents across Dakar, Diourbel, Kolda, Saint Louis, and Thiès

*Senegal sample distribution by segment and region*

| Segment | Dakar | Diourbel | Kolda | Saint Louis | Thiès | Total |
|---|---|---|---|---|---|---|
| U1-S (least vulnerable urban) | 162 | — | — | — | 25 | 187 |
| U2.1-S (moderately vulnerable urban) | 183 | — | — | — | 60 | 243 |
| U2.2-S (moderately vulnerable urban) | 257 | — | — | — | 15 | 272 |
| U3.1-S (most vulnerable urban) | 88 | — | — | — | 2 | 90 |
| R2-S (least vulnerable rural) | — | 253 | — | 50 | 222 | 525 |
| R3.1-S (more vulnerable rural) | — | — | 91 | — | — | 91 |
| R3.2-S (more vulnerable rural) | — | 268 | — | 19 | 1 | 288 |
| R4-S (most vulnerable rural) | — | — | 130 | 7 | — | 137 |
| **Total** | **690** | **521** | **221** | **76** | **325** | **1,833** |

*Segment codes: U = urban, R = rural; number and letter suffix denote vulnerability level within the Pathways segmentation framework applied in Senegal. Urban segments are concentrated in Dakar and Thiès; rural segments are distributed across Diourbel, Kolda, and Saint Louis, reflecting where each segment was naturally prevalent.*

*Note: Across all three countries, geographic distribution was determined by where Pathways vulnerability segments were naturally found rather than by predetermined regional quotas. This approach preserved segment integrity and ensured that the characteristics of each segment were not distorted by forcing respondents into fixed geographic allocations.*